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The EXTENSION ANIMAL HUSBANDMAN



UNITED STATES DEPARTMENT
OF AGRICULTURE
WASHINGTON,
D.C.

Serial No. 6

June, 1927

A STORY OF TWO BOYS

I left my pa, his farm, his plow,
Because my calf became his cow;
I left my pa--'twas wrong, of course,
Because my colt became his horse.
I left my pa to sow and reap
Because my lamb became his sheep;
I dropped my hoe and stuck my fork
Because my pig became his pork;
The garden truck I made to grow
Was his to sell and mine to hoe.

With pa and me it's half and half--
The cow I own was once his calf;
No town for mine; I will not bolt,
Because my horse was once his colt.
I'm going to stick right where I am
Because my sheep was once his lamb.
I'll stay with pa--he gets my vote--
Because my hog was once his shoat.
It's fifty-fifty with pa and me--
A profit-sharing company.

-- Selected.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Washington, D. C.

THE EXTENSION ANIMAL HUSBANDMAN

Issued by the Bureau of Animal Industry and the
Office of Cooperative Extension Work Cooperating.

Serial Number 6 --

-- June, 1927

So far this publication has been issued as a quarterly. The suggestion has been made that it be published more frequently, even though such a plan might necessitate a reduction in the number of pages contained in each issue. Since the prime purpose of the undertaking is to serve the State workers, your sentiment in regard to the proposal is solicited. If a majority favor the change, it is probable that arrangements can be made to carry out the suggestion. What are your desires?

This issue may be called the sheep number for it contains several good articles on various extension phases of the sheep industry. Twelve of the States employ sheep specialists, while 21 other States devote considerable attention to sheep projects under the leadership of the general animal husbandry specialists. It is therefore apparent that work of this character occupies an important position in the extension field.

Occasionally we like to have your assurance that this publication is meeting a real need--in other words, that its production is a worth-while expenditure of public funds. A communication from you or a short article for use in these pages is the best recommendation we can have.

--- C. D. L.

THE SHEEP INDUSTRY
and
A National Program of Sheep Husbandry Research

By D. A. Spencer,
In Charge, Sheep and Goat Investigations,
Bureau of Animal Industry,
U. S. Department of Agriculture.

From the beginning of recorded history sheep have been important in the life of the human race. Habitation of man in the cold zones of the earth has been especially facilitated by wool from the sheep. No other fiber is of such great importance in the manufacture of warm clothing. For centuries the sheep also has been an important source of human food. Health authorities regard it as one of the most wholesome of meat foods. For generations Great Britain has done wonders in the development and production of sheep of the mutton types and breeds. In America to-day the production of choice lamb meat and the trade in this commodity constitutes a large factor in the life of our sheep industry.

The production of wool and lambs is an important enterprise in all the major agricultural regions of the United States. Variations in climate, soil, and topography however have given rise to the development of different methods of sheep raising,

In the eastern and middle western regions and in the valleys of the far western States where farming with the plow is the prevailing practice, sheep are kept in small or moderate-sized flocks ranging from 15 or 20 ewes to as many as 100 or 200 ewes and in rare cases several hundred head but very seldom as many as 500.

On the open range areas of the far West where land is not generally adapted to the use of the plow, sheep are run in bands of 1,000 to 2,500. On these open ranges each band is under the constant care of a herder. A successful range sheep operator seldom has less than 1,000 breeding ewes if he is actually specializing in the sheep business. Many ranchmen have from 2,000 to 5,000 ewes, some have 10,000 to 20,000, and a few organized companies have from 50,000 to about 100,000 ewes. Under modern methods of range sheep management it is customary to have only from 1,000 to 2,500 mature sheep in a band and the big operators split up their holdings into bands of convenient size. When the ewes are suckling their lambs they are usually run in bands of 1,000 to about 1,200 mature ewes. After the lambs are weaned and separated from their mothers it is generally considered most economical to combine two such bands of mature ewes into one band of 2,000 to 2,500 ewes.

On the Edwards Plateau of Southwestern Texas sheep are run in pastures on fenced ranges. These fenced Texas pastures cover

about 3 to 5 sections (square miles) each and single ranches range in size from about 8 to 30 sections each. The carrying capacity of these Plateau ranges that are under fence is considerably greater than it is for the average of the open ranges. It is customary in that region to find cattle, sheep, and Angora goats all on the same ranch, and it is claimed on good authority that many of these ranges will average a total carrying capacity of about 30 head of cattle, 180 head of sheep and 100 Angora goats to the section.

Regional Problems

With an enterprise so varied in methods of production as the sheep industry of the United States, it is not surprising to find sheep growers of one part of the country unable to fully appreciate the problems of sheepmen in a distant State. Naturally this situation has obstructed the efforts that have been made to organize sheep producers so that they would have one national association or federation to express and secure in unison their needs and desires. Thus far, State and regional organizations have functioned most effectively for the benefit of sheepmen, although some worthy achievements in national legislation have been brought about through cooperation and unity of effort on the part of well qualified officials representing sheepmen of the various States or regions of the country.

The problem of an adequate experiment station and extension service for the sheep industry of America is likewise a complicated one. A number of the State experiment stations have for many years worked diligently on problems in sheep husbandry as they find them in their respective States and during the last two decades the United States Department of Agriculture, through the Bureau of Animal Industry, has conducted sheep husbandry investigations of regional or national importance. In recent years, especially since the World War, the need for correlating the activities of the State experiment stations and the United States Department of Agriculture has become more and more apparent and it is recognized that this need for regional and national correlation of research activities applies strongly to studies in sheep husbandry.

Cooperative Projects

With this situation in mind sheep husbandry workers of several State experiment stations and the United States Department of Agriculture have been bringing about a normal growth in cooperative studies of regional and national importance to the sheep industry. These cooperative projects are organized in such a way as to supplement and facilitate the State and Federal projects already established. Thus there has been no interruption of well-laid plans previously made and no sacrificing of worthy projects. On the other hand these sheep husbandry projects are growing normally into healthy research activities of national importance and great usefulness.

These cooperative projects are classified into four major project groups, viz:

Farm Sheep Investigations
Range Sheep Investigations
Studies in Wool and Other Animal Fibers
A Study of Factors which Influence the Quality
and Palatability of the Meat of Sheep.

The first work that the Bureau of Animal Industry did on these projects was inaugurated about 20 years ago. The farm sheep project was started with Southdown sheep at Middlebury, Vt., and the range sheep experiments with Rambouillet sheep at Laramie, Wyoming. About 14 years ago the study of wool was organized and put into operation. For a number of years following the World War attempts were made to study the meat of sheep, and during the last two years real progress has been made in the study of the quality of lamb meat.

At present, farm sheep investigations are in progress at the Federal stations known as the United States Animal Husbandry Experiment Farm, Beltsville, Md.; the United States Morgan Horse Farm, Middlebury, Vt., and the Belle Fourche Experiment Farm, Newell, S. D. This group of farm sheep investigations also includes cooperative projects that are conducted with the State experiment stations of Maryland, Indiana, West Virginia, Mississippi and Montana. About 2,000 sheep and lambs are used annually in these farm sheep studies and records are kept on each individual animal.

Range sheep investigations are being conducted at the United States Sheep Experiment Station, Dubois, Idaho; the United States Range Livestock Experiment Station, Miles City, Montana; and Texas Substation No. 14, Sonora, Texas. The activities in Montana and Texas are conducted in cooperation with the respective State experiment stations. About 7,500 to 8,000 sheep and lambs are used each year in these range sheep experiments in which individual records are kept of each sheep and lamb. In addition to these about 10,000 sheep owned by neighboring stockmen are used at the U. S. Sheep Experiment Station, Dubois, Idaho, for grazing studies.

Studies in Wool and Other Animal Fibers are handled at the U. S. Animal Husbandry Experiment Farm, Beltsville, Md.; the U. S. Morgan Horse Farm, Middlebury, Vt.; U. S. Sheep Experiment Station, Dubois, Idaho; U. S. Range Livestock Experiment Station, Miles City, Montana, and in cooperation with the State experiment stations of Ohio, Michigan, Indiana, West Virginia, Minnesota, Wyoming, Montana, Idaho, Washington, California, Texas, and Oklahoma. Approximately 5,700 sheep are used in these wool studies, but about 5,600 of them are accounted for under the farm sheep and range sheep projects.

The project "Factors which Influence the Quality and Palatability of Lamb Meat" is handled very largely in the laboratories of the U. S. Department of Agriculture at Beltsville, Md., and Washington, D. C.,

but the stations producing the animals that are used in this project include the farms at Beltsville, Md., Middlebury, Vt., and Newell, S. D.; the government ranches at Dubois, Idaho, and Miles City, Mont., and the farms of the experiment stations of Maryland, West Virginia, Indiana, Mississippi, and Montana. The annual program includes the slaughter of about 1,000 lambs, all of which are accounted for in the above enumerations. About 700 of these are slaughtered at Beltsville and 300 in Chicago. The 700 that are slaughtered at Beltsville are handled in great detail and the program of 1927 calls for cooking and palatability tests of 500 pieces of the meat from these carcasses. About 150 roasts of lamb have already been tested since January, 1927. Physical, chemical, and biological tests are also made in great detail. These very comprehensive meat investigations are made possible through the excellent cooperation of State experiment stations and various bureaus and branches of the United States Department of Agriculture.

The above-mentioned projects are organized according to the following outline:

Farm Sheep Investigations

The development of a practical system of pasture for sheep.
A study of the effects on lamb yields of flushing ewes at breeding time.
A study of factors which influence the growth of lambs and wool.
Type fixing of purebred sheep of the Southdown, Shropshire, Hampshire, and Corriedale breeds.
A study of the possibilities of grading up farm sheep by the use of purebred rams.
A study of the effects of castration on market lambs.
A study of age as a factor in sheep breeding.
Studies in lamb feeding.

Range Sheep Investigations

Studies in range utilization with sheep (In cooperation with the Forest Service).
Studies in wool production.
Lamb production experiments.
Development and improvement of types and breeds of range sheep of the Rambouillet, Corriedale, and Columbia breeds.
A study of flushing as a means of increasing lamb yields under range conditions.
Feeding experiments in the wintering of range ewes and the fattening of range lambs.
A study of factors which influence the growth of sheep, lambs, and wool under range conditions.

Studies in Wool and Other Animal Fibers

Studies in the yield of clean wool and the content of grease and dirt in individual fleeces of known history.
Methods of obtaining uniform samples of wool.
Studies in the moisture content of wool.
Studies of wool-scouring processes and methods of determining the shrinkage of wool.
Measuring the diameters of fibers of spinning count samples of wool and establishing technical scoring standards for the use of Bureau of Animal Industry investigators in judging the fineness of experimental wools.
Studies in the growth of wool and hair.
Investigations in the structure of wool and mohair fibers.

A Study of Factors which Influence the Quality and Palatability of the Meat of Sheep.

The influence of breed.
The influence of feed.
The effects of castration.

In developing this series of investigations an effort has been made to avoid any needless duplication of work. In cases where there is a similarity of projects between different stations it has constituted useful supplements and checks, or has been essentially due to the location of the respective stations in different types of country. Prompt publication of mature or proved results is the general policy of the workers concerned. It is the high hope of the research specialists and administrative officials engaged in this program that the results hereof shall be a fountain of useful information for extension workers in sheep husbandry.

The Kilkenny Cats

There were once two cats of Kilkenny,
Each thought there was one cat too many -
So they scratched and they bit,
They fought and they spit,
'Till, excepting their nails
And the tips of their tails,
Instead of two cats there weren't any.

RESULTS OF THE OKLAHOMA EARLY-LAMB CONTEST

About a year ago the Oklahoma Sheep Breeders and Wool Growers Association, in cooperation with the Extension Division of the Oklahoma A. & M. College, decided to sponsor a plan of sheep production which would tend to stimulate a more general interest on the part of Oklahoma sheep raisers in better methods of handling their flocks and more economical and efficient methods of producing market lambs.

As a stimulus to interest the owners of farm flocks in such a plan, the Oklahoma Early Lamb Contest was established. The object of the contest is to encourage the production of early lambs and to improve their quality through better methods of care and feeding. Any farmer or 4-H Sheep Club member in Oklahoma was eligible to enter the contest, and enrollment was made through the county agent's office.

Each flock owner, under the rules of the contest was allowed to nominate and ear-mark 15 lambs from his flock; 10 of this number to be weighed up at the close of the contest.

Basis of Award

In order to be eligible for an award each flock owner was required to have raised on an average at least one lamb for every breeding ewe offered for service during the breeding season; or in other words, a 100 per cent lamb crop. Since the percentage of lambs raised is one of the most important factors in the success of sheep husbandry, this rule was made in order to encourage the flock owners to make a special effort to save every young lamb dropped and to retain as many of the ewes as possible that normally bear twin lambs or triplets, and to cull out the less useful ones, thereby increasing the efficiency of the flock.

Another rule of the contest required that 10 of the lambs out of the number nominated must average 70 pounds each on the first day of July. A provision was made, however, that in case the lambs were sold on the market they might be weighed up any time during the month of June. In this case four-tenths of a pound per lamb per day was added to the scale weight in order to give them credit for gains they might have made for the intervening days prior to July 1.

Value of Creep Feeding Shown

The value of the practice known as "creep feeding" lambs was brought out in the contest and its importance was well demonstrated. "Creep feeding" refers to the practice of feeding young lambs grain in a protected place built in such a manner that the lambs may eat grain at will, unmolested by their mothers. Since young lambs are so much like small boys in their habits of eating, they appreciate an opportunity to feed at will, unmolested by their elders.

The important problem in growing the lamb is never to let it lose its baby fat. Many of our successful small holders of sheep supplement the mother's milk with grain fed in a creep. A very common mistake is to withhold this grain when the lambs are turned on grass. This mistake often makes all the difference between a prime lamb and a common lamb at marketing time. Lambs must be well finished when they go to market if they bring top prices.

That the practice of creep feeding is a profitable one was demonstrated by the fact that the heaviest and best finished lambs in the contest this year were creep fed and made faster gains than those receiving no grain.

Value of Docking and Trimming Shown

The rules of the contest also required that all lambs in the flocks should be docked, and that all ram lambs which were not purebreds, should be trimmed. This rule was made in order to eliminate as many long-tailed and "bucky" lambs as possible from the 1926 lamb crop and to impress the value of such practice. Lambs that are left untrimmed, usually develop a "bucky" flavor in the meat after they are about 3 months old, and, invariably, such lambs grow more and fatten less than properly trimmed lambs. A number of the experiment stations have shown that properly trimmed lambs gain from 8 to 10 per cent more rapidly when everything else is equal than those that are left untrimmed.

Properly docked wether and ewe lambs always command a premium over the long-tailed "bucky" kind which comprise a large percentage of the receipts at the central markets when spring lambs first come to market. The average increase in the market value of this practice should amount to at least \$1.00 per head when sold. Looking at it from the market standpoint, the practice of docking and trimming alone on this basis was worth at least a thousand dollars to the contestants. Besides it was a means of encouraging the practice on other farms in the community where the contestants were located.

Value of Purebred Rams Demonstrated

The value of a purebred ram in producing early market lambs was also demonstrated in the contest. The three heaviest flocks completing the contest were sired by a purebred ram. The lambs in these flocks were also more uniform in size and quality, and were more desirable from the standpoint of mutton conformation.

Number of Contestants

Thirty-two flocks in 12 Oklahoma counties were entered in the first Oklahoma Early Lamb Contest. Sixteen of the contestants finished the contest and 12 of this number met the requirements of weight and percentage of lambs raised.

Awards - 1926

The Oklahoma Sheep Breeders and Wool Growers Association cooperating with the Extension Division of the Oklahoma A. & M. College, awarded a beautiful silver loving cup to the contestant having the heaviest 10 lambs, weighing a total of 700 pounds or more on July 1, 1926, and with 120 per cent or more lambs raised.

Glen Davis of Alfalfa County, through his earnest application to the science of sheep husbandry, won the highest honor of the contest and was awarded the silver trophy. Glen is a member of the 4-H Sheep Club and made a very creditable showing at the State fair this year with his lambs. His 10 lambs weighed 942 pounds at the close of the contest; an average of 94.2 pounds per lamb, and he raised a 155 per cent lamb crop.

F. H. Pratt of Garfield County, won the silver medal offered by the Association to the contestant having raised 110 per cent and less than 120 per cent of the lamb crop, and having the heaviest 10 lambs in his class.

Fred Boschen of Oklahoma County, was the winner of the bronze medal offered to the contestant having the heaviest 10 lambs in flocks where the percentage of lambs raised was 100 per cent and less than 110 per cent.

Following are the results of the first contest ranked in the order of total weight and with the percentage of lambs raised:

First Oklahoma Early Lamb Contest Results - 1926

<u>Name</u>	<u>Weight</u>	<u>Per cent raised</u>
1. Wayne Gilbert	1,110	87
2. A. F. Wade	1,048	96
3. F. H. Pratt	961	111
4. Glen Davis	942	155
5. A. M. Ewbank	931	143
6. Fred Boschen	930	103
7. R. N. Brittain & Son	914	114
8. Donald Bolenbaugh	911	72
9. W. E. McDowell & Son	882	173
10. Theo. Lorenz	864	101
11. Ed Talley	859	100
12. Lois Morrisberger	839	111
13. John Ryan	745	154
14. Roy High	739	125
15. Oscar Amey	720	100
16. Andrew Burton	692.5	60

Those who conducted the contest this year were well pleased with the results and have already voted to sponsor the contest during 1927.

- From Oklahoma Animal Husbandry Report, 1926.

THE CALF PATHS OF THE MIND

One day through the primeval wood
A calf walked home, as good calves
should;

But made a trail, all bent askew,
A crooked trail, as all calves do.

Since then two hundred years have
fled,

And, I infer, the calf is dead.
But still he left behind his
trail,

And thereby hangs a mortal tale.

The trail was taken up next day
By a lone dog that passed that
way,

And then a wise bellwether sheep
Pursued the trail o'er vale and
steep

And drew the flock behind him,
too,
As good bellwethers always do.
And from that day, o'er hill and
glade,
Through those old woods a path was
made.

And many men wound in and out,
And dodged and turned and bent
about,
And uttered words of righteous
wrath,
Because 'twas such a crooked path.

But still they followed--do not
laugh--
The first migrations of that calf,
And through this winding woodway
stalked,
Because he wabbled when he walked.

This forest path became a lane,
That bent and turned and turned
again;

This crooked lane became a road,
Where many a poor horse, with his
load,

Toiled on beneath the burning sun,
And traveled some three milcs in
one.

And thus a century and a half
They trod the footsteps of that calf.

The years passed on in swiftness fleet,
The road became a village street,
And this, before men were aware,
A city's crowded thoroughfare.

And soon the central street was this
Of a renowned metropolis.
And men two centuries and a half
Trod in the footsteps of that calf.

Each day a hundred thousand route
Followed the zig-zag calf about;
And o'er his crooked journey went
The traffic of a continent.

A hundred thousand men were led
By one calf near three centuries dead.
They followed still his crooked way
And lost one hundred years a day;

For this such reverence is lent
To well-established precedent.

A moral lesson this must teach
Were I ordained and called to preach.
For men are prone to go it blind,
Along the calf paths of the mind.

And work away from sun to sun
And do what other men have done.
They follow in the beaten track,
And out and in, and forth and back.

And still their devious course
pursue,
To keep the path that others do,
But how the wise old wood gods
laugh,
Who saw that first primeval calf!

And many things this tale might
teach--
But I am not ordained to preach.

—Sam Walter Foss.

SHEEP EXTENSION WORK IN INDIANA

By Claude Harper, Purdue University.

This year I sold my docking and castrating shears 66 times at demonstration meetings. This does not mean the same pair of shears were sold 66 times, as such was not the case. Each time a pair of shears were sold, new ones were put in the place of those sold.

For the last six years the "mule shears" has been the only instrument used at demonstration meetings of docking and castrating lambs. There have always been inquiries as to type of shears used and places of purchase. In several cases confusion has arisen in attempting to follow directions, when making purchases. Therefore, after a discussion of this question with LeRoy Hoffman, Assistant County Agricultural Agent Leader, it was deemed good extension practice to sell the shears in use at demonstration meetings, providing the opportunity presented itself. In this way, samples would be scattered in the various communities and, when growers wanted to purchase additional supplies from the local hardware merchants, a sample would be available in the community showing type, size, brand, and distributors.

In the six years in which docking and castrating demonstrations have been conducted in Indiana, over 25,000 lambs have been used in demonstration meetings. The work has progressed to the point where a half dozen county agents found it difficult to locate farms on which to hold docking and castrating demonstrations this year. The majority of the county agents, however, feel the work is about one-half completed in their respective counties. In other words, about one-half the farmers in the majority of the counties have adopted the practice of docking and castrating lambs.

The individual losses, resulting from lambs docked and castrated at demonstration meetings during the last six years, has been less than a dozen lambs. While several factors contribute to these results, yet, I believe the use of these shears in docking and castrating lambs has been a most important factor.

* * * * *

Forty-one purebred flocks have been founded in Indiana during the last five years through Junior Lamb Club work and dozens have been taught how to feed lambs. From two to three hundred boys and girls, (mostly boys), between the ages 10 to 18 years have been completing projects in junior lamb clubs each year. Every year a few invest in purebred stock. We now have 41 of these youngsters that have been enrolled in these clubs, owners of 4 to 50 purebred ewes and rams each. In the projects conducted in this State they are first taught to feed sheep and lambs; they are never encouraged to go into the purebred

business until they have demonstrated they can feed sheep and lambs well. Furthermore, none are given assistance in purchasing purebreds until they realize they must be able to sell their purebred surplus themselves. Then when they go in the business they stay, and do not complain about the prices and markets.

Another thing the junior lamb club members are demonstrating is the usefulness of native lambs as feeders. In feeding clubs they use native lambs only, those that have been docked and castrated and weigh in the neighborhood of 50 to 65 pounds. All lambs are treated monthly for stomach worms, and in so far as possible all lambs must be sired by a purebred ram. Each youngster feeds a group of 4 to 6 lambs and shows a pen of 3 at the local round-up show. In judging these groups, emphasis is placed on market type rather than breed type. The interesting thing to me is the fact that these youngsters take these native lambs and make from one-third to one-half of a pound daily gain on them, which is a better rate of gain than the average feeder makes on western lambs. Of course, the youngster has a small group and can give individual attention. On the other hand, western lambs are generally classified as the best feeding lambs available. This, of course, is true when parasites and treatment of parasites in large numbers are considered, but the results obtained by these youngsters point to a new value of the native lamb properly handled.

* * * * *

James E. Poole, of the Union Stock Yards, Chicago, Illinois, recently stated that Indiana made the western feeder market in 1926. The fattening of these lambs is playing an important part in agriculture in several localities. The business is concentrated in communities and not widespread. I have attended meetings of sheep feeders where 25,000 or more feeding lambs were owned by those present. Many local banks in recent years capitalized at \$25,000 have held \$100,000 to \$150,000 of "sheep paper." While the fall of 1926 and early winter of 1927 have not been very profitable for these feeders, yet, a general survey shows that about 98 per cent of all 1926 loans have been paid.

We have attended many meetings and tours of sheep feeders in Indiana and our part in the program has been to discuss phases of the 17 years of lamb feeding results obtained at the Purdue Experiment Station. The local meetings and tours held in recent years have been organized cooperatively by local banks and the county agricultural agents.

* * * * *

The fifth year of the Hoosier Gold Medal Sheep Club, conducted cooperatively by the Indiana Livestock Breeders' Association and the

Purdue Agricultural Extension Department, is in full swing with 75 members located in 29 counties in the State. Jefferson county, for the third successive year, leads the list with 20 entries. The club emphasizes good breeding, feeding, management, and marketing of lambs. Four years of work have been completed. Gold, silver, and bronze medals are awarded members who make lambs in their flock reach specific weights in a given time and who rear a given percentage of lambs.

While the club is open to all classes of sheep, lambs sired by purebred rams have won 95 per cent of the medals. Several members using grade rams have entered in the club, but only three have produced lambs that have been able to qualify as medal winners. The rams which sired the gold-medal lambs represent six breeds, Shropshire, Hampshire, Oxford-Down, Dorset-Horn, Southdown, and Rambouillet. Certainly this type of demonstration is enough to convince anyone of the value of using a purebred sire of the right type.

In four years, the medal-winning lambs have averaged 80 pounds at an average age of 119 days. This makes an average daily gain of six-tenths of a pound per lamb per day after allowing eight pounds for the birthweight of a lamb. Occasionally, we hear of lambs weighing 100 pounds when 100 days old, but these are largely individual cases. When one can take 2,000 lambs and show an average daily gain of more than one-half pound per day for all lambs, considerable credit must be given the feeder. It takes regular and good feed to make such gains.

All medal winners have fed their ewes and lambs well when feed was needed. The ewes have access to legume hay in winter, beginning usually in December. Some fed grain to the ewes before lambing. All fed grain to the ewes after lambing until good pasture was available. The hay fed the ewes consisted of alfalfa, soybean, or clover. For the most part, the grain consisted of corn and oats supplemented by linseed meal and bran, or perhaps both.

As soon as the lambs were old enough to eat grain, which was about two weeks, they were given a creep in which to go for this feed. The lambs had access to legume hay, a grain ration, good pasture when available, and their mother's milk. The grain ration consisted largely of corn and oats and in some cases it was supplemented with bran and linseed meal. The pasture available to the ewes and lambs was always a green succulent feed consisting of rye, bluegrass, clover, alfalfa, or a mixed pasture containing both grasses and legumes. There seemed to be no particular type of pasture used by the various medal winners, but all insisted on having green succulent feed until the lambs reached their weights. The good feeding, together with the variety available, accounts for the excellent gains. Anyone who can make his lambs reach a market weight in four months after birth must feed his lambs well because the average period in which lambs require to reach

market weight is from six to eight months.

The medal winners have raised an average of 120 per cent of lambs to a marketable age when compared with the number of breeding ewes on hand at the beginning of the lambing season. Twelve per cent of all lambs born were lost through one cause or another. Some were born dead, some were weak, inclement weather conditions and accidents can be held largely accountable. The percentage of barren ewes in the flock averaged only three-one-hundredths of 1 per cent. Flusing the ewes at lambing time, careful selection and culling the flock, together with good care, have reduced the percentage of nonproducers to a minimum. The percentage of lambs lost is considerably below the average. This was accomplished by the owners making from 2 to 8 trips to the barn each night during the lambing season in addition to careful attention during the day. Furthermore, it must be remembered that this loss is comparatively small when one realizes the bulk of the medal-winning lambs have been born during the months of January, February, and March.

Two classes of sheepmen have been interested in the Gold Medal Sheep Club -- the purebred breeders and the producers of market lambs.

The purebred breeders have become interested because it gave them a production record on their flocks, officially recognized by the Indiana Livestock Breeders' Association. The purebred men who have entered in the Gold Medal Sheep Club have, for the most part, been small breeders most of whom have no showring records back of their flocks. When they found an opportunity of getting a recognized production record, several became interested. It has been a distinct asset in selling their surplus stock.

The producer of market lambs is interested in the Hoosier Gold Medal Sheep Club from the standpoint of producing a type of lamb that brings good financial returns. Previous demonstrations in Indiana have shown that lambs marketed before July 1 of each year have been more profitable to growers than those marketed during October, November, and December. During the last four years, most of the market lambs produced in these flocks have sold at the top of the market on the days they reached the market. In several cases, lambs have been marketed above 20 cents per pound. Hence, the results of the club during a 4 year period show the value of good breeding, feeding, management, and marketing of lambs.

TOGETHER -- one of the most inspiring words in the English language. Coming together is a beginning; keeping together is progress; working together is success.

-- Edward Everett Hale

TON LITTER WORK IN TENNESSEE

By J. H. McLeod, Swine Specialist,
University of Tennessee Extension Service.

The finishing of 121 ton litters in Tennessee was due to continuous effort on a single project for three consecutive years. In 1924, the year the project was begun there were 33 litters finished, and in 1925, there were 67.

In a Southern State where the bulk of hogs is produced by men owning only one sow, it is necessary that a large number of farmers be reached if many litter demonstrations make the goal of a ton.

In our effort to keep the project before the people, all the regular extension channels have been used; namely, the county agents, newspapers, fairs, farm tours, farm meetings, and cooperation with the vocational agricultural teachers.

Each of the above mentioned means of publicity has played an important part in reaching the goal of the past year, and it is quite likely that we would not have had Tennessee standing in the first place of ton litters finished if each of these means had not been used. County agents, newspapers, fairs, and vocational agricultural teachers, however, will have to be given the major credit for the accomplishment.

All these means of publicity mentioned are familiar to every extension worker, but the use of fairs for exhibiting ton litters is at least unusual for some States. While there are some disadvantages in using the fairs for ton-litter demonstrations we feel that the advantages outweigh the disadvantages, and we have been using this means of getting the work before the people for the last three years. Then, too, the farmers themselves like the pleasure of the competition where all hogs are weighed on the same scales by the same man.

The first year of the ton-litter contest at the State Fair we had 17 litters exhibited. In 1925 there were 30, and in 1926 the same number. In addition, there have been different county and district fairs that have had from 1 to 10 exhibits of ton litters yearly.

Over each pen is placed a placard giving the weight, age, breed, amount of feed, total cost, and cost per pound gain of each litter. This feature has been especially educational and has never ceased to attract the attention of both farmers and town people.

The scale of weights used at the fairs for comparison and placing are the same as the ones worked out by the University of

Wisconsin, namely:

At 180 days of age, 2,000 pounds; for each day over, 20 pounds additional gain is required.

At 165 days of age, 1,700 pounds; for each day over, 20 pounds additional gain is required.

No one is permitted to show a litter less than 165 days of age and it has now reached a point where but few show litters run much over 180 days. The weight in excess of that required is what determines the placing.

Extremely heavy litters have been the exception in Tennessee. Our rules require that a sow can not have any more pigs counted in the litter than she has teats giving milk. In the three years of the contest there have been only two sows farrowing and suckling as many as 14 pigs. There has been only one litter finished with 7 pigs. One sow in the contest farrowed 15 pigs, but had only twelve teats and three pigs were therefore thrown out.

There have been 41 counties to finish ton litters during the three years. The average number of pigs per litter has been a fraction above 10. There have been more litters with 9 pigs finished than any other number. The greatest total weight reached was one of the litters of 14 pigs, weighing 3,810 pounds. The litter making the greatest average weight was a litter of 8 pigs weighing 3,578 pounds. These pigs were fed on a simple ration consisting of corn, shorts, and skimmilk. It is the simple rations that we recommend the farmers stick to.

In the ton-litter work every phase of the project has been stressed. However, the greatest emphasis has been placed upon feeding, and it is from this particular feature that we feel we have obtained the best results.

The lack of the use of protein feeds in the hog ration has been the greatest shortcoming of the farmers in this State. In giving publicity to the results of ton-litter feeding, the value of tankage or skimmilk added to the corn ration has always been emphasized. While there are several creameries in the State, there are relatively few farmers who have skimmilk for their hogs. Tankage has therefore been made our main reliance as a protein supplement to corn.

That there has been some progress made in this direction may be seen from the following report of county agent W. E. Schmidt: "Seventy per cent of the hog population of Sumner county is being fed tankage and mineral mixtures as a supplement to corn this year in comparison with 3 per cent in 1924. This change was brought about through the ton-litter demonstration work which showed farmers they

could make more profit out of hogs by proper feeding and giving proper care. During the last two years 25 ton litters have been finished in the county and scores of farmers are now feeding all their hogs by that method. Last year the Sumner County Creamery handled 20 carloads of tankage for its patrons to be used in fattening hogs."

One County Farm Bureau during the last 12 months brought in 145 tons of tankage. The agent reports that this represents an increase of at least 200 per cent in the use of this feed and states that it is due to the results of the ton-litter demonstrations.

The use of this quantity of tankage in a county does not mean so much in comparison with a Corn Belt county where hog feeding has been established on a more permanent basis, but in certain sections of the South where animal protein feed has been little used, it represents much in the way of better balanced rations and cheaper gains.

Personal Notes

Turner Wright, for several years leader in animal husbandry extension in South Dakota, resigned on January 1 to take up resident teaching work in the South Dakota Agricultural College. W. R. Hauser, formerly his assistant, succeeds him.

A. A. Dowell, who is known far and wide for his successful promotion of the Minnesota Car Load Baby Beef Contest, resigned on April 15 to accept the superintendency of the Northwest School and Station at Crookston, Minnesota. W. E. Morris, Assistant County Agent Leader in the same State has been appointed to succeed Mr. Dowell.

H. H. Havner, leader in animal husbandry extension in Pennsylvania, sailed for Europe on April 29, where he will spend about three months studying livestock conditions in Great Britain, Denmark, Belgium, France, Germany, and Italy.

A. C. Allen has been appointed Assistant Livestock Specialist in Colorado.

COLORADO FEEDING DEMONSTRATIONS

By B. W. Fairbanks, Livestock Specialist,
Colorado Agricultural College.

The newspapers have called them new methods of doing extension livestock work. We have called our six field feeding demonstrations an effort to make livestock demonstrations more definite. They were established in six different sections of Colorado to solve local problems by the application of experimental data. Blanket recommendations for an entire State can not be made. In each of these six demonstrations a specific question was asked and the answers found were given out at a local feeders' day held on the ranch of the demonstrator. After the livestock were marketed the final results were published in extension service leaflets.

San Miguel Lamb Feeding Demonstration

Only one of the six field demonstrations will be discussed in detail here. The same methods were used in all of them. It was conducted in a territory known to Colorado extension workers as the San Miguel Basin and it has been called the San Miguel Lamb Feeding Demonstration.

The San Miguel Basin is located in southwestern Colorado, comprising the County of San Miguel and the western portion of Montrose County. The land is very fertile and an abundance of feed and forage crops are produced. Unfortunately, this basin is practically without railroad facilities, and all products must be hauled great distances. No local market exists for large quantities of feed and forage crops, so that prices are very low. The cost of shipping out feed and forage crops is prohibitive. The policy of the Colorado Extension Service, however, is to feed home grown feeds at home. The fattening of lambs and cattle would provide a needed and an efficient market. Feeder lambs and cattle are readily obtained locally as the San Miguel Basin has long been associated with the range cattle and sheep industry.

Feeding investigations conducted by the Colorado Agricultural Experiment Station and other stations indicate that corn and alfalfa is an excellent ration for the fattening of lambs. High quality alfalfa is raised abundantly in the San Miguel Basin, but conditions are not entirely favorable to the growing of corn for grain. Barley and wheat are the two grains which are produced, and the former has been urgently recommended as a small-grain crop by the Extension Agronomist. Wheat is grown as a cash crop, but the price must be very favorable to make it show a profit after the high charges of difficult marketing are paid. Experimental data shows that both barley and wheat can be used in the fattening of lambs. Some corn is grown for silage, and is advocated for dairymen. With alfalfa as cheap as it is in the San Miguel Basin, corn silage has no place in the lamb fattening ration, and it was desired to demonstrate this

point. In addition, we undertook to demonstrate that lambs could be fattened profitably on a ration of barley, alfalfa hay, and corn in the basin.

The San Miguel Lamb Feeding Demonstration had five objectives: In the first place it was desired to demonstrate that lambs could be finished profitably in the San Miguel Basin and territories tributary to it. So far as known these are the first lambs that were ever finished in this section. As three different rations were fed, the second objective was to demonstrate the feeding values of three combinations of home-grown feeds. The third objective was to demonstrate the comparative feeding value of barley and wheat fed with alfalfa hay. The fourth objective was to demonstrate that corn silage is an excellent supplement to alfalfa hay only when the latter is high in price and hay conservation is necessary for profitable returns. The last objective was to collect data on shrink to market, and the expenses incurred in shipping and selling. This last object was of especial importance in view of the long distance that the lambs had to be trucked to the railroad, and the long railroad haul over two mountain passes.

The Colorado Extension Service purchased 175 lambs which were in good feeding condition, being vigorous and thrifty, but lacking somewhat in uniformity. They were sorted into two bunches of 75 each, and one bunch of 25. In sorting, great care was taken to have the lots uniform as to weight, condition, and size of lambs. The initial cost of the lambs on the range was \$12.00 per cwt., and into the feed lot \$12.12 per cwt. The demonstration started at noon, November 8, 1926.

The three lots of lambs were quartered in open corrals throughout the demonstration. The corrals were well drained and remained dry throughout the feeding period. Alfalfa hay was fed by the "narrow-panel" method, which is extensively used in the old-established lamb feeding sections within our State, and has proved very valuable in saving hay, as the lambs push the hay to each other. The grain was fed in separate grain yards and fed from reversible grain troughs.

The barley was of the Corcess variety, developed at the Colorado Experiment Station. The wheat was Defiance, and both the barley and the wheat were fed whole. The corn silage was from a trench silo, and apparently had been ensiled when too dry. The alfalfa hay was second cutting and of good quality. One or two stacks fed contained some orchard grass. All feeds were readily eaten except the wheat, where some difficulty was experienced in getting the lambs to "clean-up" when the quantity was increased above one pound per head per day.

The following table gives the results of each lot in detail.

LAMB FEEDING DEMONSTRATION

62.5 lb. lambs--2 lots of 75 lambs each and 1 lot of 25,
fed 109 days - Nov. 8, 1926 to Feb. 25, 1927

(Table based on one average lamb)

	Lot 1	Lot 2	Lot 3
Ration	Barley	Wheat	Corn silage
	Alfalfa	Alfalfa	Alfalfa
Source of water	Seepage	Seepage	Open ditch
Lambs in lot	No.: 75	75	25
Initial weight at feedlot. lbs.	62.31	63.00	61.70
Final weight at Denver "	91.60	88.40	83.60
Average gain "	29.29	25.40	21.90
Average daily gain "	0.27	0.23	0.20
Shipping shrink - per cent	2.3	3.9	0.7
Daily feed eaten:			
Barley (Colcess) lbs.	0.99	---	0.99
Wheat (Defiance) "	---	0.99	---
Corn silage "	---	---	1.44
Alfalfa hay (2nd cutting)"	2.90	2.81	2.39
Feed required for 100 lbs. gain:			
Barley lbs.	368.7		492.7
Wheat "		424.8	
Corn silage "			716.7
Alfalfa hay "	1079.2	1205.9	1189.5
Feed cost per 100 lbs. of gain:	\$7.31	\$7.69	\$11.10
Initial cost at \$12.12 per cwt:	\$7.55	\$7.64	\$ 7.48
Feed cost per head	2.14	1.95	2.43
Int. on inv. feed & lambs, 8%	.26	.26	.26
Shipping and selling expense	1.22	1.20	1.07
Total cost at Denver	\$11.17	\$11.05	\$11.24
Return at \$14.00 per cwt.	\$12.82	\$12.38	\$11.70
Labor return per head	1.65	1.33	.46

Feed costs:

Barley - - - \$1.25 per cwt.: Wheat - - - \$1.10 per cwt.
Alfalfa - - - 5.00 per ton : Corn silage \$5.50 per ton

The foregoing not only demonstrates that lambs can be finished on home-grown feeds, but that the lambs furnish a satisfactory market, which does not exist at the present time for the feeds and forage crops produced. Thus, local ranchers get by means of the lambs the prevailing price for the feeds at their ranches, have the manure to improve their ground, and receive a wage or profit for the feeding.

The lambs of Lot 1, fed barley and alfalfa hay, dressed out 48.3 per cent. Thirty-six of these lambs were graded on the hooks as choice; 27 choice, but too heavy; and 12 graded good. The lambs fed wheat and alfalfa dressed 49.2 per cent, 27 were graded as choice; 17 good; 28 good, but too heavy; and 3 medium. Lot 3, fed barley, corn silage, and alfalfa hay, dressed 49.5 per cent, with 11 lambs grading choice and 14 grading good. On the hooks, 42.2 per cent of the lambs were selected as choice or "bag" lambs, which are used for the fancy trade, demonstrating that a high quality fat lamb can be produced on home-grown feeds in the San Miguel Basin. The quality of these lambs was further manifested by the fact that they were the first 14 cent lambs sold last season on the Denver market.

As the lambs sold for \$14.00 per cwt. straight through we asked for an appraisal by lots. The barley-alfalfa lambs of Lot 1, were considered superior to the other two lots, and were appraised at \$14.15 per cwt. The wheat-alfalfa lambs were appraised at \$13.95, with 6 lambs out at \$13.00 per cwt. The barley, silage, alfalfa lambs were very even, but lacked finish, so were appraised at \$13.90 per cwt. These appraisals are equivalent to a \$14.00 flat price. This is included to show the variation according to the ration fed. It is noteworthy that the barley lambs were considered more than 20 cents per cwt. better than the wheat lambs. This demonstrates the value of barley as a feed crop.

Lot 2, receiving wheat and alfalfa hay, required more grain and hay for 100 lbs. of gain than the barley-alfalfa lot. Further, one ton of barley replaced 2,304.3 lbs. of wheat and 687.28 lbs. of alfalfa in producing 100 pounds of gain. With wheat at \$22.00 per ton and alfalfa hay at \$5.00 per ton, the replacement value of barley is \$27.07 per ton, or \$2.07 greater than its cost. Barley increased the average daily gain 0.04 lbs. per head per day, reduced the cost of 100 lbs. of gain 44 cents, and increased the labor return 32 cents per head. While this demonstrates the superiority of barley as a feed, it is believed that it further demonstrates a favorable market for wheat during years of low prices.

The addition of corn silage to a barley and alfalfa ration did not give results equal to those obtained in previous demonstrations. In this demonstration it required more grain and hay for 100 pounds of gain, the average daily gain was the lowest, and it gave the smallest

labor return per head. The corn was quite dry when it was ensiled, and the lambs on corn silage had to drink ice-cold water from an open ditch while the lambs in the other two lots had seepage water which was several degrees warmer. Such unavoidable conditions interfered with the making of an accurate demonstration on the feeding value of corn silage.

COOPERATION

Two fool jackasses - say, get this dope!
Were tied together with a piece of rope.
Said one to the other, "You come my way,
While I take a nibble from this new-mown hay."
"I won't," said the other, "You come with me,
For I too have some hay, you see."
So they got nowhere, just pawed up dirt,
And Oh, by golly! that rope did hurt.
Then they faced about, these stubborn mules,
And said, "We're acting like human fools!"
"Let's pull together, I'll go your way,
Then come with me and we'll both eat hay."
Well, they ate their hay, and they liked it too,
And swore to be comrades good and true.
As the sun went down they were heard to bray,
"Ah! This is the end of a perfect day!"

A man can not thrive by grain unless he has livestock; and he who tries to keep grain unless he has stock must either be a borrower or a beggar.

- Sir Anthony Fitzherbert - 1534

HORSE NOTES FROM ANNUAL REPORTS

Illinois

The extension service of the University purchased a Collins dynamometer with which horse and mule pulling contests were held at nine county fairs. The object was to demonstrate the efficiency of horses and mules and to interest farmers in better horses and better horsemanship. These contests proved to be very popular and it is estimated that they were witnessed by more than 35,000 people.

Each fair provided two classes--one for teams under 3,000 lbs. in weight and another for teams of 3,000 lbs. and over, with cash prizes of \$40, \$30, \$20, and \$10 in each class. A total of 82 light and 39 heavy teams entered the competitions.

Fair officials were emphatic in their praise of the contests.

Pennsylvania

Because of the demand for same, together with the limited fair season, two dynamometers were in operation. Sixteen demonstrations were held in 16 different counties in which 183 teams competed. They were witnessed by over 50,000 people.

Eleven feeding and management meetings attended by 329 farmers were held.

Ton-gelding clubs are in existence in 2 counties, the one in Jefferson county having been organized 3 years ago. On 4 farms in this county club colts are the sole farm power. In practically every instance the club colts have earned their keep since they were 2 years old and at the same time have been developing into creditable geldings. Such clubs afford a splendid opportunity to teach the proper combination of grains for feeding as well as the prime points of care and management of the horse.

The filly club of Franklin County, organized in 1925, is making good progress.

Washington

Dynamometer pulling contests were staged at 7 fairs with an estimated attendance of 59,000 people. We have had many applications for the use of the machine at next year's fairs, and it is only a matter of time until it will be necessary to have a second machine. Cash prizes of \$25, \$15, and \$10, were provided by all the fairs for each weight class. A total of 48 teams competed, including 5 pairs of mules and one yoke of oxen.

Kansas

Seventeen hitching demonstrations in 14 counties were conducted in cooperation with the Horse Association of America. The results were very encouraging. There was an average attendance of 130 farmers at each meeting, many of whom came 50 to 60 miles to see it. Similar work will be continued next year.

Massachusetts

The use of the Collins dynamometer, to replace the stone-boat in pulling contests, was introduced during the year. The machine, while purchased by seven fairs belonging to the Massachusetts Fairs Association, is owned and operated by the college in accordance with rules laid down by the Horse Association of America.

The dynamometer made its initial appearance in New England at a special demonstration given before a crowd of 2,000 persons on the Massachusetts Agricultural College campus late in July. Since that time more than 50,000 people in the State have crowded the bleachers and ropes around the course to get a view of the contests that were held.

KEEP PADDLING

Two frogs fell into a bucket of cream
And had to paddle to keep afloat,
But one soon tired and sank to rest
With a gurgling sigh in his throat.
The other paddled away all night
And not a croak did he utter,
And with the coming of morning light,
He rode on an island of butter.
The flies came thick to his island home,
And made him a breakfast snappy;
The milkmaid shrieked and upset the pail,
And froggy hopped away happy.

A moral we all may find in this rhyme,
And should without ceasing apply--
Success will come in the most difficult time
If we paddle, and never say die.

WEST VIRGINIA LAMB IMPROVEMENT WORK

Since West Virginia has never had a very good reputation on the terminal markets for the production of market lambs an attempt to improve the situation by organized effort has been undertaken. Preliminary to active work in 1926, a conference of leaders was held on March 16 for the purpose of discussing subject-matter, policies, and technique. The meeting proved profitable in that every person present made some contribution to the program to be followed and obtained the same viewpoint of the whole problem.

Since more than 96 per cent of all lambs produced in the State are sold as market lambs, it was determined that special emphasis should be put on the essentials of economic production, standardization of the product, and efficient marketing.

Twenty of the leading sheep counties were covered in the campaign, which began immediately and lasted until May 15. The counties involved all had livestock shipping associations.

The campaign occupied one full week in each county under the direction of a team consisting of a State staff worker, the county agricultural agent, and the county shipping association manager. Field meetings were held during the day, in demonstrating the best practices in docking and castrating, and treating for internal parasites. Community meetings were held at night and a county-wide meeting on Saturday. Seventeen county meetings were held with a total attendance of 570 farmers; 82 community night meetings with an attendance of 1640; and 121 field meetings and demonstrations with a total attendance of 847, or a grand total of 2,057 farmers attending the meetings. A total of 1,421 lambs were docked and castrated in the demonstrations.

In connection with the campaign a flock management survey was made which revealed fairly well the general farm practices in sheep husbandry. Ten different breeds of purebred rams were reported as being used. In the order of their popularity they were: Southdown, Shropshire, Hampshire, Dorset, Oxford, Delaine, Cheviot, Scotch Highland, Lincoln, and Rambouillet, only one each of the last three named being found. Southdowns numbered nearly as many as Shropshires and Hampshires combined. It was further disclosed that about 20 per cent of all rams being used were grades and scrubs. Also that about 90 per cent of the rams are turned with the flocks between October 15 and November 15 and a large percentage of the lambs are marketed during the month of August.

Marketing

During 1926, 2,639 shippers marketed a total of 18,042 lambs through our cooperative shipping associations. The average shrink was 10.5 per cent as compared with 10.6 per cent in 1925 and 11.7 per cent in 1924. The handling costs per hundredweight was \$1.10, as compared with \$1.13 in 1925 and \$1.14 in 1924.

Ram Sales

The first ram sale and educational field day was held on September 29. It was a cooperative enterprise sponsored by the State extension service, the Baltimore Union Stock Yards, the B. & O. R. R., and the Weston Chamber of Commerce. Two hundred and fifty farmers attended and 60 purebred rams were sold. More than 40 other rams had gone direct to farmers from the place of purchase. In all, 300 high-class rams were distributed among the farmers in 14 counties. This was so encouraging that preliminary plans have been made with the B. & O. R. R. Co., whereby that company will cooperate in the running of a special ram train in 1927.

Fairs and Exhibits

In cooperation with the State Department of Agriculture, an educational exhibit was put on at eight county fairs to demonstrate the market grades of lambs and wool. Three pens of lambs were shown which were typical of the 3 grades - good to choice, medium to good, and cull to common. The "good to choice" pen contained two docked and castrated high-grade Southdown lambs that were fat and weighed about 80 pounds each. The "medium to good" pen had two docked but uncastrated lambs that were coarse and not carrying the finish of the first pen. The third pen was undocked and uncastrated, thin of flesh and weighed only about 60 pounds.

The wool exhibit represented all the commercial grades of wool with their relative values. The off-grades, like the sisal tied, braid, cotted, burry and seedy, and gray, were emphasized as being unprofitable to the producer. These exhibits attracted much attention and had in them a financial lesson for the sheep producer.

-- From West Virginia Animal Husbandry Report, 1926.

Whenever you get up against a difficulty you should be on the eve of a discovery.

A FEW RECENT STATE PUBLICATIONS

Hothouse Lamb Production by Henning and MacKenzie -- Pennsylvania State College Bulletin No. 209.

Lamb Feeding Experiments in the Sugar Beet Growing Districts by James A. Holden -- Nebraska Experiment Station Bulletin No. 216.

Testing Draft Horses by Collins and Caine -- Iowa Experiment Station Bulletin No. 240.

Pastures for Pigs by Morrison, Fargo and Brant -- Wisconsin Circular No. 213.

Profitable Pigs - Tennessee Extension Circular No. 7.

Steps in the Ton-Litter Method of Feeding Hogs by J. H. McLeod -- Tennessee Extension Publication No. 147.

Hog Houses and Equipment by H. P. Twitchell -- Ohio Extension Bulletin No. 57.

Nebraska Portable Hog Houses by Posson and Wood -- Nebraska Extension Circular No. 230.

Pastures for Hogs by L. A. Weaver -- Missouri Experiment Station Bulletin No. 247.

Feeding Beef Cattle in California by H. R. Guilbert -- California Extension Circular No. 3.

A Study of Various Rations for Finishing Range Calves as Baby Beeves by H. R. Guilbert -- California Experiment Station Bulletin No. 418.

A Survey of the Cattle Industry in the Nebraska Sand Hills by Harold Hedges -- Nebraska Experiment Station Bulletin No. 215.

Fattening Calves in Arizona by Stanley and Scott -- Arizona Experiment Station Bulletin No. 116.

An Economic Study of the Cattle Feeding Enterprise in Iowa by John A. Hopkins, Jr. -- Iowa Experiment Station Bulletin No. 242.

Beef Cattle in Montana by Vinke and Arnett -- Montana Experiment Station Circular No. 133.

Cottonseed Meal, Cold Pressed Cake and Linseed Oil Meal Rations for Fattening Cattle by H. M. Garlock -- Missouri Experiment Station Circular No. 153.

The Mineral Feed Problem in Wisconsin by Hart, Steenbock and Morrison -- Wisconsin Experiment Station Bulletin No. 390.